

PC

AP-M Owner's Manual

Worldwide
Informatio
Systems

Bull

READ ME FIRST

The PC AP-M is currently shipped with a single Setup and Special Utilities diskette. In the future, the system will be shipped with separate Setup and Special Utilities diskettes.

The 1.44-megabyte drive, mentioned throughout this manual, is not currently supported, but will be supported in the near future.



AP-M OWNER'S MANUAL

SUBJECT

Installation Procedures for the Bull PC AP-M Personal Computer

The following notice is provided in accordance with the United States Federal Communications Commission's (FCC) regulations.

This equipment generates and uses radio frequency energy and if not installed and used properly, that is, in strict accordance with manufacturer's instructions, may cause interference to radio and television reception. It has been type tested and found to comply with the limits for a Class B computing device in accordance with the specifications in Subpart J of Part 15 of FCC Rules, which are designed to provide reasonable protection against such interference in a residential installation. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient the receiving antenna
- Relocate the computer with respect to the receiver
- Move the computer away from the receiver
- Plug the computer into a different outlet so that computer and receiver are on different branch circuits.

If necessary, the user should consult the seller or an experienced radio/television technician for additional suggestions.

WARNING: This equipment has been certified to comply with the limits for a Class B computing device, pursuant to Subpart J of Part 15 of FCC Rules. Only peripherals (computer input/output devices, terminals, printers, etc.) certified to comply with the Class B limits may be attached to this computer. Operation with non-certified peripherals is likely to result in interference to radio and TV reception.

This reprint includes updated information.

ORDER NUMBER

HS28-00

DOCUMENT NUMBER

71018236-100

April 1989

Bull



USER COMMENTS FORMS are included at the back of this manual. These forms are to be used to record any corrections, changes, or additions that will make this manual more useful.

This document was issued July 1988 as HS28-00 by Document Issue Notice BLCDH7455.

Bull disclaims the implied warranties of merchantability and fitness for a particular purpose and makes no express warranties except as may be stated in its written agreement with and for its customer.

In no event is Bull liable to anyone for any indirect, special or consequential damages. The information and specifications in this document are subject to change without notice. Consult your Bull Marketing Representative for product or service availability.

IMPORTANT SAFETY INSTRUCTIONS

Follow these instructions to operate the product safely.

1. Read all these instructions.
2. Save these instructions for later use.
3. Follow all warnings and instructions marked on the product.
4. Unplug this product from the wall outlet before cleaning. Do not use liquid cleaners or aerosol cleaners. Use a damp cloth for cleaning.
5. Do not use this product near water.
6. Do not place this product on an unstable cart, stand, or table. The product may fall, causing serious damage to the product.
7. Slots and openings in the cabinet and the back or bottom are provided for ventilation; to ensure reliable operation of the product and to protect it from overheating, these openings must not be blocked or covered. The openings should never be blocked by placing the product on a bed, sofa, rug, or other similar surface. This product should never be placed near or over a radiator or heat register. This product should not be placed in a built-in installation unless proper ventilation is provided.
8. This product should be operated from the type of power source indicated on the marking label. If you are unsure of the type of power available, consult your Honeywell Bull Representative or local power company.
9. This product is equipped with a 3-wire grounding type plug, a plug having a third (grounding) pin. This plug fits into a grounding-type power outlet. This is a safety feature. If you are unable to insert the plug into the outlet, contact your electrician to replace your obsolete outlet. Do not defeat the purpose of the grounding-type plug.
10. Do not permit anything to rest on the power cord. Do not locate this product where persons walk on the cord.
11. If an extension cord is used with this product, make sure that the total of the ampere ratings on the products plugged into the extension cord does not exceed the extension cord ampere rating. Also, make sure that the total of all products plugged into the wall outlet does not exceed 15 amperes.
12. Never push objects of any kind into this product through cabinet slots. They may touch dangerous voltage points or short out parts that could result in a risk of fire or electric shock. Never spill liquid of any kind on the product.
13. Except as explained elsewhere in this manual, do not attempt to service this product yourself. Opening or removing those covers that are marked "Do Not Remove" may expose you to dangerous voltage points or other risks. Refer all servicing in those compartments to service personnel.

14. Unplug this product from the wall outlet, and refer servicing to qualified service personnel under the following conditions:
- When the power cord or plug is damaged or frayed.
 - If liquid has been spilled into the product.
 - If the product has been exposed to rain or water.
 - If the product does not operate normally when the operating instructions are followed. Adjust only those controls that are covered by the operating instructions since improper adjustment of other controls may result in damage and often requires extensive work by a qualified technician to restore the product to normal operation.
 - If the product has been dropped or the cabinet has been damaged.
 - If the product exhibits a distinct change in performance, indicating a need for service.

This manual is divided into the following sections and appendixes:

Section 1: Introduction to the PC AP-M

Section 1 describes the components of the PC AP-M, including optional devices that you can add to the basic system.

Section 2: Installing the PC AP-M

Section 2 provides instructions for installing the AP-M.

Section 3: Powering On, and Performing System Setup

Section 3 tells you how to power on the system, and provides instructions for performing system Setup.

Appendix A: If You Have a Problem

Appendix A describes problems that you can easily fix yourself, without technical support assistance. These problems, and their solutions, are listed in a Problem Solving Table.

Appendix B: Changing the System Unit Switch Settings

Appendix B explains the switch block settings on the main board for the PC AP-M, and how to change these settings when installing certain options.

Appendix C: System Information Worksheet

Appendix C is a System Information Worksheet in which you enter important information about your PC AP-M, such as the number and type of options installed on your system, and component serial numbers.

Appendix D: Technical Data and Specifications

Appendix D provides technical information of use to technical personnel and programmers.

Appendix E: Special Utilities

Appendix E provides descriptions of special utilities that are unique to the PC AP-M.

NOTATIONAL CONVENTIONS

The following notational conventions are used throughout this manual:

<brackets> Brackets surrounding a word, number, character, or combination of these, indicates that you should press the key or key combination surrounded by the brackets. For example, <Ctrl-Alt-Del> indicates that you should press the Ctrl, Alt and Delete keys simultaneously.

RELATED PUBLICATIONS

This manual does not describe operating system or applications software. Please consult the appropriate manuals for instructions on using software.

The PC AP-M Diagnostics Utilities are discussed in the *PC AP-M Diagnostics Manual*.

PUBLICATION REMARKS FORM

Honeywell Bull invites you to use the Remarks Form at the end of this manual to note any publication errors, or to offer suggestions for improvement.

CONTENTS

	Page
SECTION 1 INTRODUCTION TO THE PC AP-M.....	1-1
Unpacking.....	1-2
Checklist.....	1-2
Features.....	1-3
System Unit.....	1-3
Monitor.....	1-5
Keyboard.....	1-5
Diskettes and Drives.....	1-5
Hard Disks.....	1-6
The 40 MB Tape Drive.....	1-7
The System Setup Utility.....	1-8
Diagnostic Tests.....	1-9
Technical Information For the Basic System.....	1-9
SECTION 2 INSTALLING THE PC AP-M.....	2-1
Preparing for Installation.....	2-2
Where to Install the PC.....	2-2
Precautions When Installing the PC.....	2-3
Installing the System.....	2-4
Overview of Installation Procedures.....	2-4
Required Tools.....	2-4
Removing the System Unit Cover.....	2-5
Installing the Monitor Controller Board and Internal Options.....	2-6
Connecting the Lithium Battery.....	2-6
Checking the System Unit Switch Settings.....	2-8
Replacing the System Unit Cover.....	2-9
Connecting the Keyboard.....	2-10
Connecting the Monitor.....	2-10
The System Unit.....	2-11
Connecting Printers, Modems, and other External Devices.....	2-13
Connecting a Parallel Printer.....	2-13
Connecting a Modem, or other RS-232C Device.....	2-15

	Page
SECTION 3 POWERING ON, AND PERFORMING SYSTEM SETUP....	3-1
The System Setup Utility.....	3-2
Performing Setup When You Install the AP-M.....	3-3
Before You Power On the System.....	3-3
Powering On the System.....	3-4
Performing Setup After the Initial Installation.....	3-5
Using the Setup Menus.....	3-6
Changing the System Parameters.....	3-8
Available Settings.....	3-10
Precautions When Using Your PC.....	3-13
Protecting Your Equipment.....	3-13
Radio or TV Frequency Interference.....	3-13
APPENDIX A IF YOU HAVE A PROBLEM.....	A-1
Basic Problem Solving.....	A-2
Problem Solving Table.....	A-3
Diagnostics Utilities.....	A-4
APPENDIX B CHANGING THE SYSTEM UNIT SWITCH SETTINGS...	B-1
The Switch Settings.....	B-2
Standard Switch Settings.....	B-3
What the Switch Settings Mean.....	B-4
Changing the Switch Settings.....	B-5
APPENDIX C SYSTEM INFORMATION WORKSHEET.....	C-1
APPENDIX D TECHNICAL DATA AND SPECIFICATIONS.....	D-1
Specifications.....	D-2
System Processor.....	D-2
Random Access Memory (RAM).....	D-2
Read Only Memory.....	D-2
Calendar Clock.....	D-2
I/O Facilities.....	D-2
Option Slots.....	D-2
Keyboard.....	D-3
Available Diskette Drives.....	D-3
Available Hard Disk Drives.....	D-4
Tape Drives.....	D-6
Dimensions.....	D-7
Weight.....	D-8
Power.....	D-8
Recommended Operating Environment.....	D-8
Operating System.....	D-8
Supplied Software.....	D-8
Expansion Slot Connections.....	D-9
I/O Address Map.....	D-10

APPENDIX E SPECIAL UTILITIES

The TURBO command.....	E-1
Changing to High Speed.....	E-2
Changing to Low Speed.....	E-2
Automatically Powering On Your System at High Speed.....	E-2
GLOSSARY.....	g-1

ILLUSTRATIONS

1-1	System Unit (Front View).....	1-3
1-2	System Unit (Rear View).....	1-4
1-3	System Unit Disk Drives and Compatible Diskettes....	1-7
3-1	Removing the Shipping Blanks.....	3-3
3-2	Setup Menu.....	3-8
B-1	Switch Block Location.....	B-2
B-2	Standard Switch Settings.....	B-3
B-3	Switch Setting Definitions.....	B-4

TABLES

3-1	Hard Disk Type Numbers.....	3-18
-----	-----------------------------	------

Section 1

INTRODUCTION

TO THE PC AP-M

In this section:	See page
Unpacking.....	1-2
Checklist.....	1-2
Features.....	1-3
System Unit.....	1-3
Monitor.....	1-5
Keyboard.....	1-5
Diskettes and Drives.....	1-5
Hard Disks.....	1-6
The 40 MB Tape Drive.....	1-7
The System Setup Utility.....	1-8
Diagnostic Tests.....	1-9
Technical Information For the Basic System.....	1-9

Summary This section describes the contents of the PC AP-M package, and provides an overview of the system's features.

UNPACKING

Unpack the AP-M on a large, clean work area, such as a table or a desk.

NOTE: The system unit weighs about 30 pounds. You may want to have someone help you remove it from its box.

After unpacking the system, save the packing materials for possible future use.

Appendix C of this manual is a System Information Worksheet. As you install the system, use the worksheet to record information that you may need to reference in the future, such as component parts and serial numbers.

Checklist

Depending on the components ordered for your particular system, your package should include items from the following list. Check your packing list to verify that you have received the correct items. If anything is missing or damaged, contact your Honeywell Bull representative.

Manuals

- This Owner's Manual
- AP-M *Diagnostics and Troubleshooting Guide*
- *MS-DOS User's Guide*
- *MS-DOS Reference Manual*

Diskettes

- DOS Diskettes
- PC AP-M User Diagnostic Diskette
- PC AP-M Setup diskette
- PC AP-M Special Utilities Diskette

Equipment

- System unit
- Keyboard
 - Keyboard documentation
- Monitor
 - Monitor video and power cables
 - Monitor controller board
 - Monitor board documentation
 - Monitor documentation

Optional Components

In addition to the items listed above, your system may have been ordered with optional components, such as memory expansion boards, disk drives, printers and cabling. Check your packing list to verify that you have received any options that were ordered.

FEATURES

System Unit

Figures 1-1 and 1-2 show the features of the AP-M system unit:

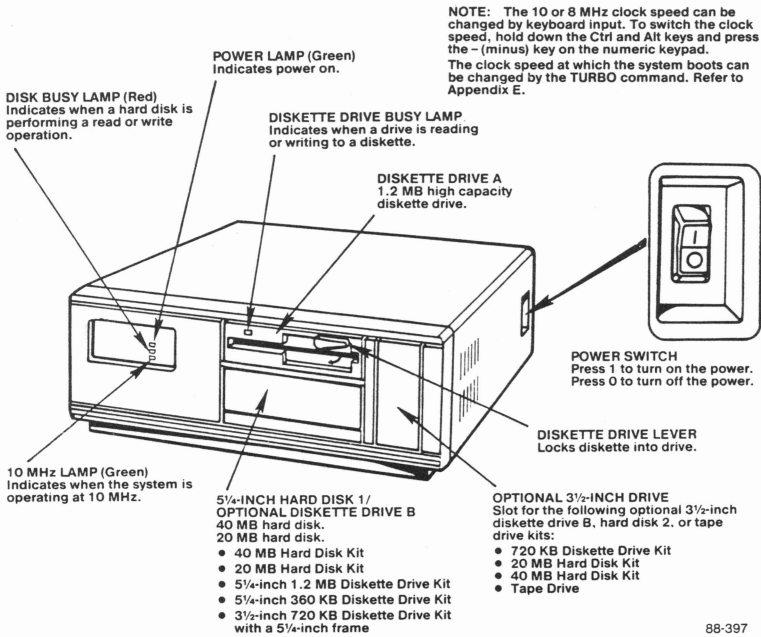
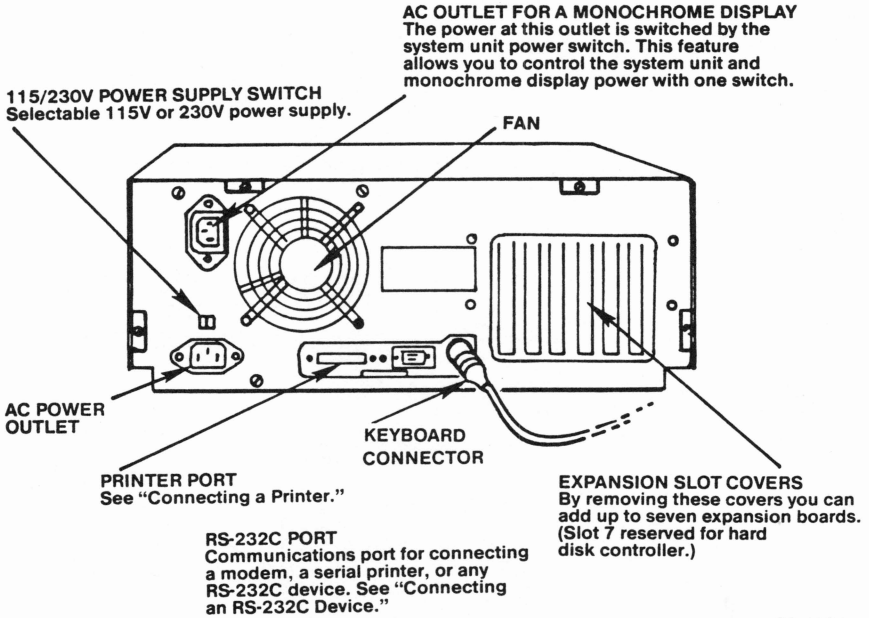


Figure 1-1. System Unit (Front View)



88-416-1

Figure 1-2. System Unit (Rear View)

Monitor

Several monitors are available for the AP-M. For a description of the monitor shipped with your system, see the documentation shipped with the monitor.

Keyboard

Several keyboards are available for the AP-M. For a description of the keyboard shipped with your system, see the documentation shipped with the keyboard.

Diskettes and Drives

The AP-M contains a floppy disk drive that uses 1.2 MB, high-capacity diskettes. It may also contain either an optional 360 MB or 1.2 MB diskette drive that uses double-density or high-capacity diskettes, or an optional 720 KB or 1.44 MB, 3-1/2 inch diskette drive that uses double-density or high-capacity diskettes.

Figure 1-1 shows the locations where these drives are installed in the AP-M. Check your packing list to verify that the correct drives are installed in your system.

It is important that you use the correct diskettes for the types of drives installed in your system.

- The 1.2 MB, high-capacity disk drive uses high-capacity, or double-sided, double-density 5-1/4 inch diskettes.
- The optional 360 KB diskette drive uses only double-sided, double-density 5-1/4 inch diskettes.
- The optional 3-1/2 inch, 720 KB microdiskette drive uses only 3-1/2 inch double-density diskettes.
- The optional 3-1/2 inch 1.44 MB microdiskette drive uses 3-1/2 inch high-density or double-density diskettes.

NOTE: You must format blank diskettes before you can use them. Refer to the *MS-DOS Reference Manual* for formatting instructions.

Hard Disks

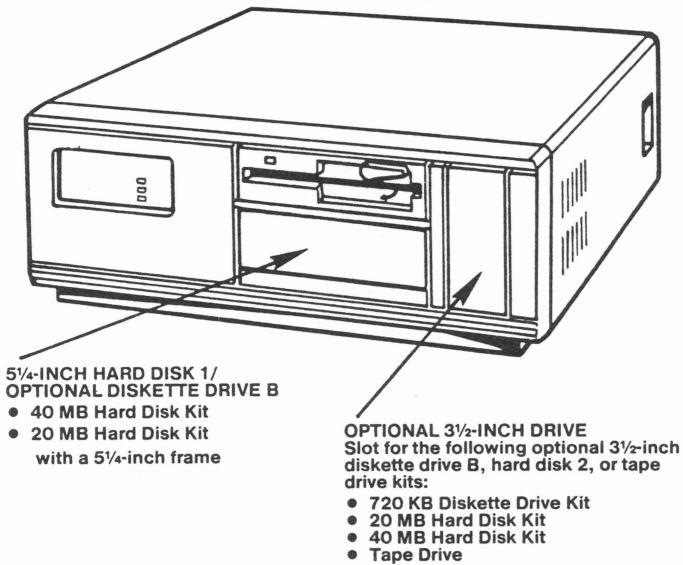
Your AP-M may contain one or two or the following optional hard disk drives:

- 3-1/2 inch with 5-1/4 inch bezel, 20 MB hard disk
- 3-1/2 inch with 5-1/4 inch bezel, 40 MB hard disk
- 3-1/2 inch, 20 MB hard disk
- 3-1/2 inch, 40 MB hard disk.

Figure 1-3 shows the possible locations of hard disk drives in the AP-M system unit.

NOTES: If your system was not ordered with a hard disk installed, it probably does not contain a hard disk controller board. Therefore, if you order a hard disk at a later time, you may also have to order a hard disk controller board.

You must partition hard disks before you format them. Refer to your MS-DOS documentation for instructions on partitioning and formatting.



88-398

Figure 1-3. System Unit Disk Drives and Compatible Diskettes

The 40 MB Tape Drive

Your AP-M may contain an optional 40 MB tape drive. The drive fits in a 3-1/2 inch drive slot. You can use the drive to back up your hard disk, archive data, store data off line, and transfer data between computers.

The System Setup Utility

After you install the AP-M and connect the battery and any options, you must run the System Setup utility to configure the system. In the setup utility, you provide information about your particular system, such as the number and type of drives, memory configuration, and the date and time. The setup information is saved in battery powered memory, and is referenced by the system each time you power on or reboot by pressing <Ctrl-Alt-Del>.

Normally, you need to perform setup only once, when you first install your system. However, if the battery powered setup information is lost for any reason, or if you change the configuration of your AP-M (by adding an additional drive, for example), you must perform setup again.

Refer to Section 3 for instructions on performing setup.

Diagnostic Tests

The AP-M User Diagnostics diskette contains a variety of tests that you can run on your system. For instructions on running these tests, refer to the *PC AP-M Diagnostics And Troubleshooting Guide*.

Technical Information for the Basic System

- 80286 microprocessor.
- Clockrate of 8/10 Mhz, selectable by software.
- 640-kilobyte (KB) Random Access Memory (RAM), expandable in 512 KB increments, 2 megabytes (MB) per board. Total memory expandable to 8 MB.
- 64 KB Read-Only Memory (ROM).
- One 5-1/4 inch, 1.2 MB high-capacity diskette drive.
- Diskette drive controller board, contained on the main system board.
- Hard disk drive controller board (installed in slot 7).
- One parallel port.
- One RS-232C port, for asynchronous communications up to 9600 bps.
- Seven expansion slots:
 - Five 8/16-bit, full size slots
 - One 8-bit, full size slot.
 - One 8/16-bit, half size slot (reserved for hard disk controller).
- 110/230-volt (V) switchable power supply.
- Calendar/clock with lithium battery backup.

Section 2 INSTALLING THE PC AP-M

In this section:	See page
Preparing for Installation.....	2-2
Where to Install the PC.....	2-2
Precautions When Installing the PC.....	2-3
Installing the System.....	2-4
Overview of Installation Procedures.....	2-4
Required Tools.....	2-4
Removing the System Unit Cover.....	2-5
Installing the Monitor Controller Board and Internal Options.....	2-6
Connecting the Lithium Battery.....	2-6
Checking the System Unit Switch Settings.....	2-8
Replacing the System Unit Cover.....	2-9
Connecting the Keyboard.....	2-10
Connecting the Monitor.....	2-10
The System Unit.....	2-11
Connecting Printers, Modems, and other External Devices.....	2-13
Connecting a Parallel Printer.....	2-13
Connecting a Modem, or other RS-232C Device.....	2-15

Summary This section provides instructions for installing the PC AP-M, and any external options that were ordered with your system.

PREPARING FOR INSTALLATION

Where to Install the PC

Install the AP-M:

- On a steady surface, capable of supporting the weight of the PC and related equipment.
- In an area that is free from excessive vibration and dust.
- Out of direct sunlight.
- Away from temperature and humidity extremes, in an area sufficiently ventilated for cool operation.
- Within easy reach of properly fused, grounded power outlets, preferably with protection from power surges.
- On a separate power circuit from high voltage devices, such as copy machines.
- With enough room around the unit so you reach the sides and back during installation.
- Away from devices that generate magnetic fields, such as electric motors or transformers.

Precautions When Installing the PC

Static electricity can damage PC components. Take the following precautions to prevent static damage:

- Touch the cover of the system unit before touching boards or other system components, and when unplugging the power cord.
- Do not handle printed circuit boards (such as a monitor board or memory expansion board) more than is necessary.
- Hold boards by their edges, and do not touch the board's components unless it is necessary.
- Do not handle chips more than is necessary.
- When installing components in the system unit, complete the installation and replace the system unit cover before leaving the work area.
- Do not install the PC in an area where static electricity is a problem. Some carpets, for example, generate static electricity.

Detailed requirements and specifications appear in Appendix D.

INSTALLING THE SYSTEM

Overview of Installation Procedures

Installing the AP-M consists of the following steps:

1. Removing the cover from the system unit.
2. Installing the monitor controller board, and any other internal options ordered with your system, into the system unit.
3. Connecting the lithium battery.
4. Checking the switch settings on the bottom of the system unit.
5. Replacing the system unit cover.
6. Connecting the keyboard.
7. Connecting the monitor.
8. Connecting printers, or other external devices.
9. Checking to see that the voltage selection switch is set correctly.
10. Connecting cables from peripheral devices. Connecting the power cord, and turning the power on.
11. Preparing the PC for operation by performing System Setup (described in Section 3).

Required Tools

To install the system, you need the following tools:

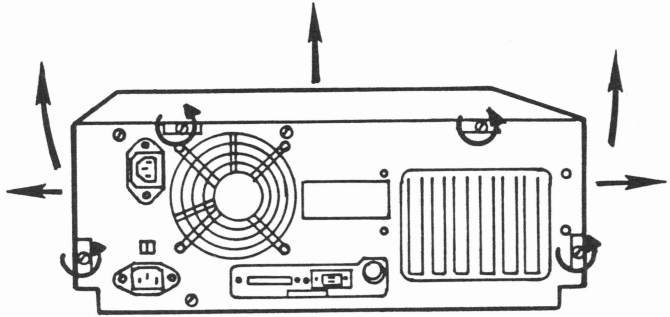
- A small flat-blade screwdriver
- a Phillips-head screwdriver.

Removing the System Unit Cover

To install the monitor controller board and other internal options, and to connect the Lithium battery, you must remove the cover from the system unit.

To remove the cover:

1. Remove the four screws at the back of the system unit that attach the cover to the base.
2. Pull the sides of the cover outward. Lift and remove the cover.



88-412

Installing the Monitor Controller Board and Internal Options

For instructions on installing the monitor controller board and any internal options that were ordered with your system (such as a memory expansion board or an additional drive), refer to the documentation shipped with the board or option.

NOTE: When you install certain options, such as additional diskette drives, you must make adjustments to the switch settings on the main system board of the PC. Refer to Appendix B for instructions.

Connecting the Lithium Battery

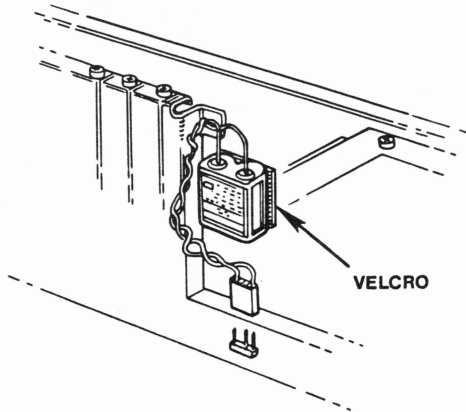
The PC uses a lithium battery to maintain system memory when it is not connected to an electrical outlet. In order to keep the battery from draining during shipment, the PC is shipped with the battery disconnected.

WARNING

Improper handling of lithium batteries may cause fire, explosion, and severe burns. Before installing the battery, read the following precautions:

- Use extreme care when disposing of the battery.
- Do not heat the battery above 100 degrees Celcius (212 degrees Fahrenheit).
- Do not recharge the battery.
- Do not disassemble the battery.
- Do not solder directly to the cells.
- Do not incinerate the battery.
- Do not expose the battery to water.

To connect the battery, plug the battery connector into the main board.

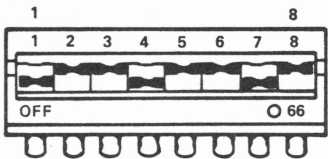


88-399

Checking The System Unit Switch Settings

The illustration below shows the standard system unit switch settings for the AP-M. These settings are appropriate for most software and hardware configurations.

Refer to Appendix B for definitions of the switch settings, and instructions on changing the settings.

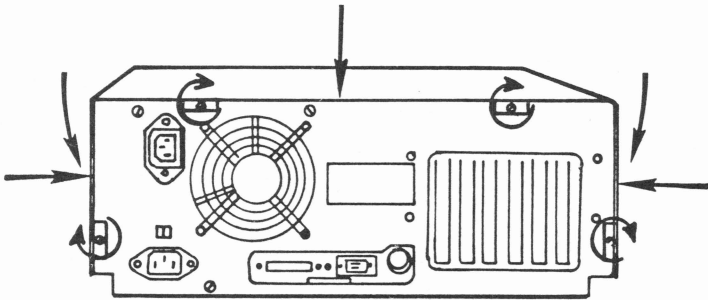


88-400

Replacing the System Unit Cover

To replace the system unit cover:

1. Insert the front edge of the cover under the lip of the front panel, and lower the cover into position.
2. Replace the four screws.

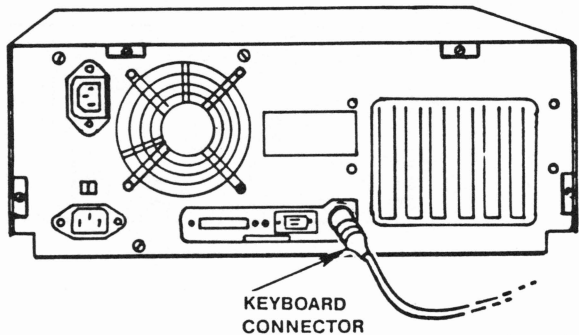


88-413

Connecting the Keyboard

Plug the keyboard cable into the keyboard connector at the back of the system unit, as shown below. Be sure that the pins on the cable connector are aligned with the holes on the system unit connector.

NOTE: Several keyboards are available for the PC AP-M. For a description of the layout and functions of the keyboard shipped with your system, refer to the documentation shipped with the keyboard.



Connecting the Monitor

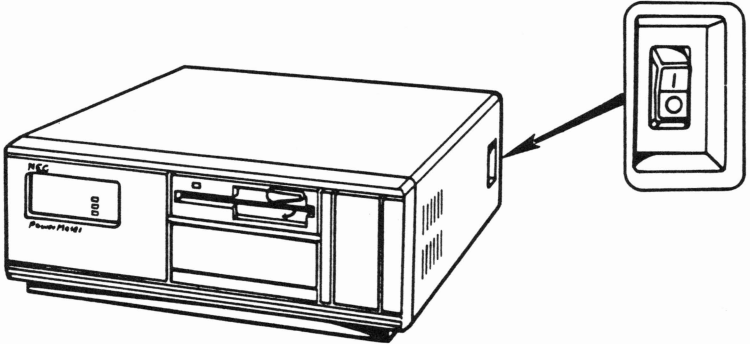
Several monitors are available for the PC AP-M. For instructions on installing and using the monitor shipped with your system, refer to the documentation shipped with the monitor.

NOTE: The auxiliary power outlet on the system unit provides a maximum of 2 amperes of power. If your monitor requires more than 2 amperes, plug the monitor power cable into an electrical wall outlet, rather than the system unit.

The System Unit

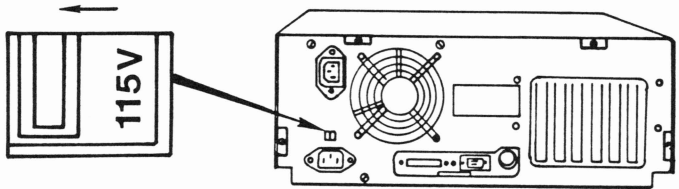
To install the system unit:

1. Be sure that the system unit power switch is in the OFF position.



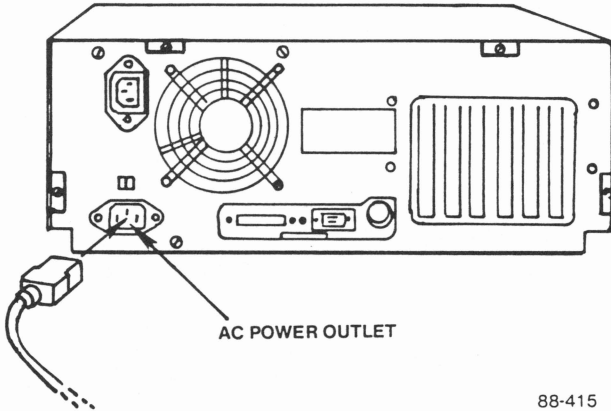
88-401

2. Check to see that the 115/230V voltage selection switch on the back of the system unit is set correctly. The normal setting for the United States and Canada is 115V.



88-402

3. Plug one end of the PC power cord into the power outlet at the back of the system unit.



88-415

4. Plug the other end of the power cord into a properly grounded electrical wall outlet.

NOTE: The system unit comes with approved, three-pronged safety power cords. To ensure your safety, do not alter the cord.

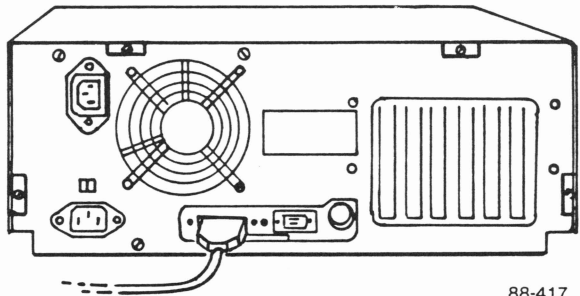
Connecting Printers, Modems, and Other External Devices

Connecting a Parallel Printer

NOTE: Before you connect a printer to the system unit, be sure that you have correctly set up the printer. For instructions, refer to the documentation shipped with the printer.

To connect a parallel printer:

1. Check to see that the PC and printer power switches are turned off.
2. Standard switch settings on the main system board are set to enable the parallel port for LPT1 operation. Refer to Appendix B for instructions on setting switches.
3. Connect one end of the printer cable to the parallel printer port at the back of the system unit, and the other end to the printer.



88-417

Secure the cable at both ends, as follows:

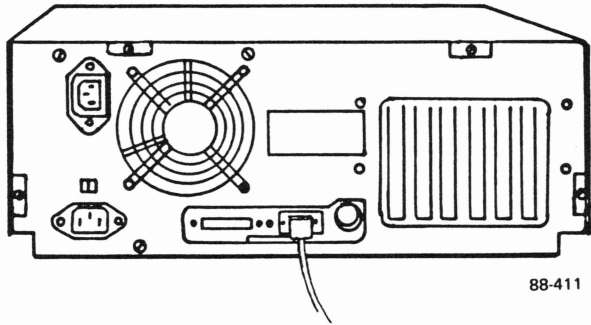
- Tighten the screws at the system unit end of the cable.
- Lock the cable connector to the printer by latching the connector clips.
- Attach the ground wire to your printer's ground screw.

NOTE: The cable supplied with your printer may have a different fastening technique.

Connecting a Modem or Other RS-232C Device

To connect an RS-232C device, such as a modem:

1. Turn off the power on the system unit and other devices connected to it.
2. Standard switch settings on the main system board of the system unit are set to enable the serial port for COM1 operation. Refer to Appendix B for instructions on setting switches.
3. Connect one end of the RS-232C cable to the RS-232C port at the rear of the system unit and the other end to the device. Tighten the screws at both ends of the cable to secure the connections.



Section 3 POWERING ON, AND PERFORMING SYSTEM SETUP

In this section:	See page
The System Setup Utility.....	3-2
Performing Setup When You Install the AP-M.....	3-3
Before You Power On the System.....	3-3
Powering On the System.....	3-4
Performing Setup After the Initial Installation.....	3-5
Using the Setup Menus.....	3-6
Changing the System Parameters.....	3-8
Available Settings.....	3-10
Precautions When Using Your PC.....	3-13
Protecting Your Equipment.....	3-13
Radio or TV Frequency Interference.....	3-13

Summary This section provides instructions for powering on the AP-M and performing system Setup.

THE SYSTEM SETUP UTILITY

The system Setup utility allows you to enter information about the following items into your AP-M's battery-powered memory.

- The time
- The date
- The number and types of drives installed in your system
- The amount and types of available memory
- The presence or absence of an arithmetic coprocessor
- The primary display type.

When you power on the AP-M, it checks this information against the actual components of your system. The information must be correct in order for the AP-M to power on correctly.

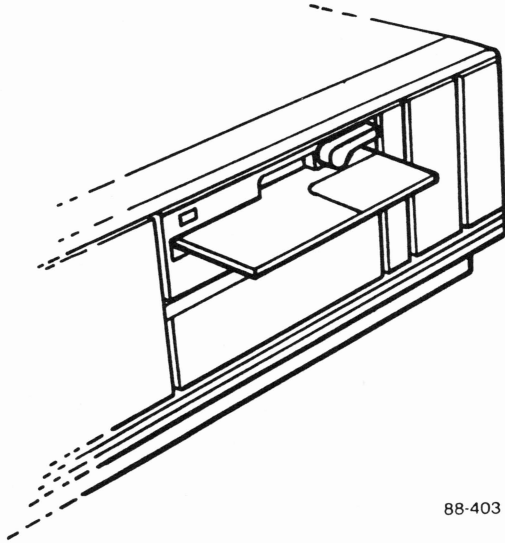
Normally, you need to perform Setup only once, the first time you power on your AP-M after installing it. However, if the battery-powered Setup information is lost for any reason after the initial installation, or if you change the configuration of your PC (by adding an additional drive, for example), you must perform Setup again.

PERFORMING SETUP WHEN YOU INSTALL THE AP-M

Before You Power On the System

Before you power on the system, remove the cardboard shipping blank(s) from the diskette drive(s) (Figure 3-1).

NOTE: The blank was installed at the factory to protect the drive during shipment. Save the blank for future use if you move or pack the AP-M for shipping. You should not use diskettes for this purpose.



88-403

Figure 3-1. Removing the Shipping Blanks

Powering On the System

To power on the system:

1. Insert the Setup And Special Utilities diskette in drive A.
2. Turn the power switch to the ON (|) position.

The system automatically runs a series of diagnostic tests, and checks the battery-powered memory for Setup information.

Messages appear briefly on the screen, indicating the results of the diagnostic tests and the battery-powered memory check.

Normally, the system beeps once to indicate a successful power on. If the system beeps two or more times, it indicates that either the Setup information in battery-powered memory is incorrect, or a diagnostic test has failed.

Because this is the first time you have powered on the AP-M, and have not yet performed system Setup, the system cannot find the Setup information in battery-powered memory. The AP-M beeps twice, and displays the following message:

Invalid configuration information - please run
SETUP program.
Strike the F1 key to continue

This message also appears, after the initial installation, if you have changed your system's configuration and have not entered the changes into the system Setup, or if the battery-powered memory has been lost for any reason.

NOTE: If the system beeps intermittently, turn the power off, wait a few seconds until all motion of the disk drives has stopped, and try powering on the system again. If the intermittent beeping continues, your system has a failure. Refer to the *Fact Folder* (Order No. GZ98) included with your shipment, for instructions on contacting Bull for assistance.

3. Press the F1 key. The system continues to load.

4. When the DOS prompt (A>) appears, type:

SETUP

and press the Enter key.

The Main Setup menu is displayed. Refer to "Using The Setup Menus" for instructions on entering Setup information.

PERFORMING SETUP AFTER THE INITIAL INSTALLATION

To perform Setup after the initial installation:

1. Place the Setup And Special Utilities diskette in drive A.
2. Turn the system unit power switch ON (|).
3. After the system successfully runs the diagnostic tests and checks the battery-powered memory, the DOS prompt (A>) appears.
4. Type:

SETUP

and press the Enter key. The Main Setup menu appears. Refer to "Using The Setup Menus" for instructions on changing the Setup information.

USING THE SETUP MENUS

When you type SETUP at the DOS prompt during your initial installation of the AP-M, or with the Setup And Special Utilities diskette in drive A, the Main Setup menu (Figure 3-2) appears.

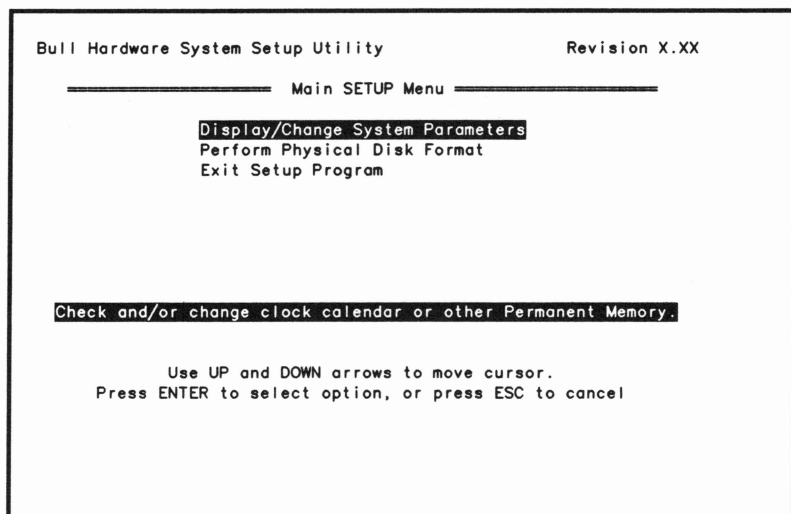


Figure 3-2. Main Setup Menu

When the Main Setup menu appears, the Display/Change System Parameters option is highlighted. To select this option:

- Press the Enter key. The System Parameters menu (Figure 3-3) appears.

Bull Hardware System Setup Utility		Revision X.XX
	SYSTEM PARAMETERS	
TIME:	0:0:0	
DATE:	01/01/1980	
DISKETTE DRIVE A:	360 Kbyte (5 1/4")	
DISKETTE DRIVE B:	Not Installed	
HARD DISK 1:	Type 39 - 20 Mb	
HARD DISK 2:	Not Installed	
BASE MEMORY	640K	
EXTENDED MEMORY	Not Installed	
MATH COPROCESSOR	Not Installed	
PRIMARY DISPLAY	EVC, VGC or Other Graphics Board	
EXIT		
CHANGE SYSTEM PARAMETERS		
DISPLAY SYSTEM BOARD SWITCH SETTINGS		
RETURN TO PREVIOUS MENU		
Change the current settings of the System Parameters.		
Use UP and DOWN arrows to move cursor		
Press ENTER to select option, or press ESC to cancel.		

Figure 3-3. System Parameters Menu

The upper area of the menu contains two columns of information:

- The left column contains a list of the Setup parameters (time, date, component information). The current selection is highlighted.
- The right column contains a list of the current settings stored in battery-powered memory.

When the System Parameters menu first appears, the area beneath the System Parameters listing contains selectable items that allow you to:

- Change the system parameters
- Display system board switch settings
- Return to the previous menu.

The bottom of the screen contains information on moving the cursor and selecting parameters from the System Parameters listing.

Changing the System Parameters

To change the system parameters:

- Make sure that CHANGE SYSTEM PARAMETERS is highlighted in the area beneath the System Parameters listing.
- Press Enter. The highlight moves to the TIME parameter.
- To select parameters, use the up and down arrow keys to move the highlight to the parameter you want to define. Press Enter to select the parameter.

When you select a parameter, information on the parameter, or a listing of available settings for that parameter appears beneath the parameter listing, as shown below:

Enter the current time (hh:mm)

- You can now:
 - Type a setting for the selected parameter
 - or
 - Select from the list of available settings, if one is displayed.

- When you have typed or selected the new setting, press Enter. The new setting appears in the right column of the System Parameters listing.

The new settings are not entered into battery-powered memory until you exit the Setup menu, with the exception of the date and time, which are entered immediately.

- Follow this procedure for each setting you wish to enter or change.
- When you have entered or changed the desired settings, move the highlight to EXIT and press Enter. The following message appears:

Save All Changes
Exit Without Saving Changes

- Select "Save All Changes," and press Enter. The following appears:

The System Parameters have been set.
Press any key to reboot the system.

If you change your mind, and want to stay in the System Parameters menu and define further parameters, press Esc.

Available Settings

Following are descriptions of the information that appears beneath the System Parameters listing when you select each parameter.

The information shown on your menu depends on the firmware installed in your system. The settings for your system may vary slightly from those listed below.

If you are installing your AP-M for the first time, you should also enter the Setup information in Appendix C for future reference. If you are performing Setup after the initial installation, refer to Appendix C for the correct settings for your system.

Time Enter the time (hh:mm).

Date Enter the date (mm/dd/yyyy).

Diskette Drive A When you select this parameter, the following appears:

 Select type for diskette drive A
 360 Kb (5 1/4")
 1.2 Mb (5-1/4")
 720 Kb (3-1/2")
 1.44 Mb (3-1/2")

NOTE: If your AP-M has only one diskette drive, you must define it as drive A.

Diskette Drive B When you select this parameter, the following appears:

 Select type for diskette drive B
 360 Kb (5 1/4")
 1.2 Mb (5-1/4")
 720 Kb (3-1/2")
 1.44 Mb (3-1/2")
 Not Installed

Hard Disk 1 When you select this parameter, a list of drive types appears. Only four drive types appear at a time. Use the up and down arrow keys to scroll through the list, until you find the correct drive type.

Select type for Hard Disk 1:

Not Installed	80 MB
20 MB	130 MB
40 MB	140 MB
42 MB	300 MB
66 MB	Other

Hard Disk 2 When you select this parameter, a list of drive types appears. Only four drive types appear at a time. Use the up and down arrow keys to scroll through the list, until you find the correct drive type.

Select type for Hard Disk 2:

Not installed	80 MB
20 MB	130 MB
40 MB	140 MB
42 MB	300 MB
66 MB	Other

NOTE: You cannot have a drive 2 without first having a drive 1.

Base Memory When you select this parameter, the following appears:

Enter the amount of Base System Memory, in kilobytes, installed in your system (In HBI systems, this is normally 640K)

Possible settings include:

256 KB	448 KB	640 KB
320 KB	512 KB	
384 KB	576 KB	

Powering On, and Performing System Setup

Extended Memory When you select this parameter, the following appears:

Enter the amount of Extended Memory,
in kilobytes, installed in your system
(Valid entries are 0 through 15360 kilobytes)

You can enter any number between 0 and 15360, in 64 KB increments. For example, enter 128 for a system with 640 KB base memory and 128 KB extended memory.

Math Coprocessor When you select this parameter, the following appears:

Select Math Co-Processor status
Installed
Not Installed

Primary Display When you select this parameter, the following appears:

Select Primary Display Board
Color Graphics Board
EVC, VGC or Other Graphics Board
Monochrome Board

If you select the Color Graphics Board, the following appears:

Select Color Graphic Display Mode
40 Column
80 Column

NOTE: If you have changed the display setting by using the DOS MODE command, a message appears, indicating that your setting and the system board setting do not match. Although the system usually operates even when the settings are different, you may experience difficulties. Refer to your monitor controller board documentation for more information.

PRECAUTIONS WHEN USING YOUR PC

Protecting Your Equipment

Take the following precautions with your system components, diskettes and disk drives:

- Protect equipment and diskettes from liquids, smoke, dust, dirt, heat, and magnetic fields.
- Use caution when moving equipment.
- Place cardboard inserts in diskette drives when moving the system unit. Diskettes should not be used for this purpose.
- Use the PARK utility on the MS-DOS diskette to protect hard disks when they are being moved.
- Place diskettes that are not in use in their protective envelopes.
- Keep diskettes and disk drives away from sources of magnetic or electromagnetic fields, such as magnetized screwdrivers, motors or loudspeakers.

Radio or TV Frequency Interference

If your PC creates interference to radio or television reception, try the following methods to correct the problem:

- Change the direction of the radio or television antenna.
- Move the PC in relation to the radio or television.
- Move the PC farther away from the radio or television.
- Plug the PC and peripherals into a separate power outlet from the radio or television.

Appendix A IF YOU HAVE A PROBLEM

In this appendix:

See page

Basic Problem Solving.....	A-2
Problem Solving Table.....	A-3
Diagnostics Utilities.....	A-4

Summary

This appendix describes problems that you can easily fix yourself, without technical support assistance. A problem solving table lists the problems, and their solutions.

BASIC PROBLEM SOLVING

Power-On Diagnostics Tests

When you power on your PC, it runs a series of diagnostic tests to verify that the system has powered on without errors, and is functioning correctly. If one of the diagnostic tests fail, the PC beeps intermittently. If this happens repeatedly when you turn on the power, turn the PC off, and call your Honeywell Bull representative.

If you encounter a problem, and beeping does not occur, check the items in the following list:

- Is the power switch for each component on?
- Are all cables and power cords installed correctly and securely fastened?
- Is the electrical outlet that your components are connected to working? Test the outlet by plugging in a lamp or other electrical device.
- Is the 115/230V power supply switch set correctly?
- Is the system unit Monitor Display Type switch set correctly for your monitor?
- Are the monitor's brightness and contrast controls adjusted properly?
- Are recently installed options compatible with your system, and installed correctly?

If these items do not help, refer to the following "Problem Solving" table. If you still cannot determine the nature of the problem, contact your Honeywell Bull representative.

PROBLEM SOLVING TABLE

Problems and Conditions	Solution
A diskette won't load. ● System unit and monitor power lamps are on. ● Diskette drive busy indicator doesn't come on when you insert the diskette. ● Power-on screen appears on the monitor.	Check that the diskette is inserted correctly, and that the load lever is down. If the lever is down, try a different diskette. If the new diskette loads, the problem is in your software. Call your Honeywell Bull representative. If the new software version does not load, call your Honeywell Bull representative.
The screen stays dark. ● System unit and monitor power indicators are on. ● All monitor cable connections are tightened. ● Brightness and contrast controls are adjusted.	Call the representative for the particular monitor you are using.
The power-on self-test remains on the screen.	Press F1. If the power-on screen appears, load a different diskette. Press F1 again. If the new diskette loads, you have a problem with the software on the first diskette. Call your software distributor. If the power-on screen is still displayed after you load the second diskette, call your Honeywell Bull representative.

Problems And Conditions	Solution
The screen image is distorted.	Adjust the video controls on your monitor. If this doesn't help, turn the monitor off for a few seconds, then turn it back on. If the problem persists, call your Honeywell Bull representative.
An image appears on the screen, but the keyboard does not work.	Check and tighten the keyboard cable connection.
Constant screen movement.	A magnetic field is affecting your monitor. If you have a device near the monitor that generates a magnetic field (such as another monitor, or a fan), move the device away from the affected monitor.

DIAGNOSTICS UTILITIES

If none of the recommended solutions solve your problem, run the appropriate diagnostics program from the PC AP-M Diagnostics diskette. For instructions, refer to the *PC AP-M Diagnostics and Troubleshooting Guide*.

Appendix B

CHANGING THE SYSTEM UNIT SWITCH SETTINGS

In this appendix:

See page

The Switch Settings.....	B-2
Standard Switch Settings.....	B-3
What the Switch Settings Mean.....	B-4
Changing the Switch Settings.....	B-5

Summary

This appendix explains the switch block settings on the main processor board of the PC AP-M. It also explains how to change these settings when installing options.

THE SWITCH SETTINGS

When you install certain options into your AP-M system unit (hard disks or monitor boards, for example), you must make adjustments to the switches located on the main processor board of the system unit (Figure B-1).

These switches define important information that the system uses when it powers-on, and during normal operation, such as how many diskette drives are installed, and whether the serial and parallel ports are enabled or disabled.

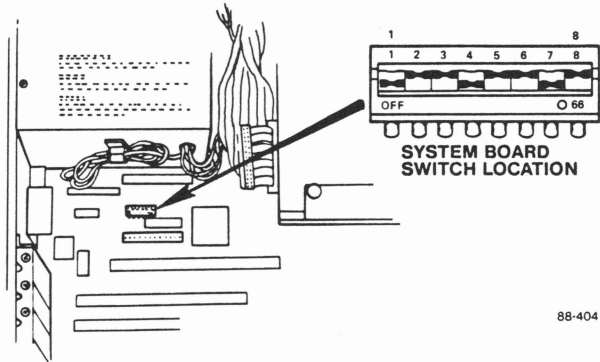
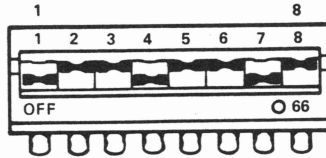


Figure B-1. Switch Block Location

STANDARD SWITCH SETTINGS

Figure B-2 shows the switch settings as they are set when you receive the AP-M. These settings are appropriate for most software and hardware configurations.



88-400

Figure B-2. Standard Switch Settings

WHAT THE SWITCH SETTINGS MEAN

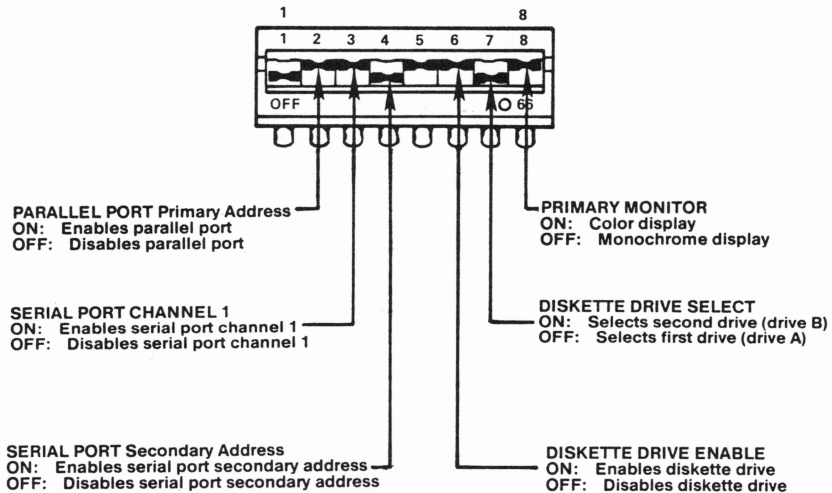
Figure B-3 shows the function of the switches on the switch block.

NOTE: If you are installing an option board that has either a parallel port using the primary address (378-37F), or a serial port using primary address (3F8-3FF) or secondary address (2F8-2FF), disable the corresponding main processor board port by changing the appropriate switch setting to OFF.

WARNING

Do not enable BOTH serial ports at the same time.

NOTE: Switches 1 and 5 must be set as shown.



88-400-1

Figure B-3. Switch Setting Definitions

CHANGING THE SWITCH SETTINGS

To change the switch settings:

1. Remove the system unit cover. For instructions, refer to "Removing The System Unit Cover" in Section 2.
2. Locate the block of eight switches on the main processor board (Figure B-1).
3. Change the appropriate switch setting by using a pointed instrument, such as the tip of a ballpoint pen.
4. Replace the system unit cover. For instructions, refer to "Replacing the System Unit Cover" in Section 2.

Appendix C SYSTEM INFORMATION WORKSHEET

In this appendix:

See page

System Information Worksheet..... C-1

Summary

This appendix is a System Information Worksheet in which you enter important information about your AP-M, such as the number and type of drives in your system unit, and component serial numbers.

System Information Worksheet

NOTE: You may want to make a copy of this worksheet, and keep it with your PC.

System Unit Number: _____
(Can be found on
the back of the PC)

SERIAL NUMBER

DATE INSTALLED

System Unit: _____

Monitor: _____

Printer: _____

Hard Disk 1: _____

☐ 20 MB (type 39)

☐ 40 MB (type 40)

Hard Disk 2: _____

☐ 20 MB (type 39)

☐ 40 MB (type 40)

Diskette 1: _____

Type And Size: _____

Diskette 2: _____

Type And Size: _____

Extension Memory: _____ MB

Date battery Installed: ____/____/____

Power Setting: ☐ 115 Vac ☐ 230 Vac

Configuration Switch Settings 1 2 3 4 5 6 7 8
(enter ON or OFF beneath each #) _____

ROM BIOS Release Level: _____

(Shown on the first screen
that appears when the
system is powered-on.)

Appendix D

TECHNICAL DATA AND SPECIFICATIONS

In this appendix:

See page

Specifications.....	D-2
System Processor.....	D-2
Random Access Memory (RAM).....	D-2
Read Only Memory.....	D-2
Calendar Clock.....	D-2
I/O Facilities.....	D-2
Option Slots.....	D-2
Keyboard.....	D-3
Available Diskette Drives.....	D-3
Available Hard Disk Drives.....	D-4
Tape Drives.....	D-6
Dimensions.....	D-7
Weight.....	D-8
Power.....	D-8
Recommended Operating Environment.....	D-8
Operating System.....	D-8
Supplied Software.....	D-8
Expansion Slot Connections.....	D-9
I/O Address Map.....	D-10

Summary

This appendix provides information of use to technical personnel and programmers.

SPECIFICATIONS

The following specifications are standard, except where noted.

System Processor

Intel PD80286-10
Word length - 16 bits
Clock rate - 8/10 MHz, selectable by software

Random Access Memory (RAM)

Standard size - 640 KB

Optional - expandable in 512 KB increments, 2 MB per board; total memory capacity expandable to 8 MB.

Read Only Memory

64 KB

Calendar Clock

Year/month/day/hour/minute/second/1/100 second, battery-backed

Battery type - lithium, nonrechargeable

I/O Facilities

Parallel - one integrated port

RS-232C - one serial port, asynchronous communication, up to 9600 bps

Option Slots

Seven slots:

- Five 8/16-bit, full size slots
- One 8-bit, full size slot
- One 8/16-bit, half size slot (reserved for hard disk controller).

Keyboard

Refer to the documentation shipped with keyboard.

Available Diskette Drives

Packaging:

- One internal 5 1/4 inch, 1.2 MB drive standard
- Optional second drives:
 - 5-1/4 inch, 1.2 MB drive
 - 5-1/4 inch, 360 KB drive
 - 3-1/2 inch, 720 KB drive
 - 3-1/2 inch, 1.44 MB drive.

Drive Performance Characteristics:

- Rotation rate
 - 1.2 MB drive - 360 rpm
 - 360 KB drive - 300 rpm
 - 720 KB drive - 300 rpm
 - 1.44 MB drive - 300 rpm
- Transfer rate
 - 1.2 MB drive - 500K bps
 - 360 KB drive - 250K bps
 - 720 KB drive - 250K bps
 - 1.44 MB drive - 500K bps

Controller - industry standard

Available Hard Disk Drives

5-1/4 inch drives:

- One internal 5-1/4 inch 40 MB drive
- One internal 5-1/4 inch 20 MB drive
- Optional second integrated drives:
 - 5-1/4 inch 40 MB drive
 - 5-1/4 inch 20 MB drive
- Number of cylinders -615
- Data transfer rate - 625 KB/second
- Rotation rate - 3,564 $\pm$ 0.5%
- Access Time (average)
 - 5-1/4 inch 40 MB drive - 40 ms
 - 5-1/4 inch 20 MB drive - 40 ms
- Start Time
 - 5-1/4 inch 40 MB drive - 25-second maximum
 - 5-1/4 inch 20 MB drive - 15-second maximum
- Stop Time
 - 5-1/4 inch 40 MB drive - 30-second maximum
 - 5-1/4 inch 20 MB drive - 15-second maximum
- Recording Method - Modified Frequency Modulation (MFM)
- Recording Density
 - 5-1/4 inch 40 MB drive - 9,000 bpi
700 tpi
 - 5-1/4 inch 20 MB drive - 9,000 bpi
700 tpi

3-1/2 inch Drives:

The 3-1/2 inch drives are provided in 3-1/2 inch or 5-1/4 inch form factor.

- One 3-1/2 inch, 20 MB drive
- One 3-1/2 inch, 40 MB drive

- Formatted Capacity
 - 20 MB
 - 40 MB

- Internal Configuration
 - 20 MB, two disks, four heads
 - 40 MB, four disks, eight heads

- Number of Cylinders
 - 20 MB, 615
 - 40 MB, 615

- Data Transfer Rate
 - 20 MB, 625 KB/second
 - 40 MB, 625 KB/second

- Rotation Rate
 - 20 MB, 3600 rpm, $\pm 1.0\%$
 - 40 MB, 3600 rpm, $\pm 1.0\%$

- Access Time (average)
 - 20 MB, 40 ms
 - 40 MB, 40 ms

- Start Time
 - 20 MB, 15 seconds
 - 40 MB, 15 seconds

- Stop Time
 - 20 MB, 15 seconds
 - 40 MB, 15 seconds

- Recording Method
 - 20 MB, MFM
 - 40 MB, MFM

- Recording Density
 - 20 MB, 14,000 bpi, 850 tpi
 - 40 MB, 14,000 bpi, 850 tpi

- Interface
 - 20 MB, ST506
 - 40 MB, ST506

Tape Drives

- Formatted Capacity
 - Per tape
 - Error Correction Coding (ECC) - 40.6 MB
 - No ECC - 45.7 MB
 - Per Track
 - ECC - 2 MB
 - No ECC - 2.3 MB
 - Per Block
 - ECC - 16,384 bytes
 - No ECC - 18,432 bytes
 - Per secondtor
 - ECC - 1,024 bytes
 - No ECC - 1,024 bytes
- Tape Format
 - Number of data tracks - 20
 - Number of blocks per track - 124
 - Number of secondtors per block - 18
 - Recording density - 10,000 bpi
 - Track density - 87 tpi
 - Data encoding method - MFM
- Performance Characteristics
 - Data transfer rate - 500K bps
 - Write precompensation - 125 ns
 - Tape speed
 - Read/write speed - 50 ips
 - Rewind/fast forward speed - 70 ips
 - End-to-end positioning time
 - Read/write speed - 49 seconds
 - Rewind/fast forward speed - 35 seconds
 - Time to dump/restore a full tape - 16.4 minutes (assuming the drive is operated in streaming mode without data verification)
 - Read/write modes supported
 - Streaming (mirror image)
 - Start/stop (file-by-file)
 - Block addressable (file update)
 - Controller - standard AP-M diskette drive interface
 - Maximum R/W speed variation
 - Instantaneous (ISV) - 3.5%
 - Long term - 1.5%
 - Start/stop time - 400 ms
 - Head positioning time
 - Adjacent tracks - 250 ms
 - Maximum - 1 second

- Media
(Capacity and tape formatting specifications apply to the 3M DC-2000 data cartridge.)
 - Type - 3M DC-2000
 - Width - 0.25 in.
 - Length - 205 ft
- Reliability
 - Error rate
 - Recoverable errors - 1 in 10^9 bits read
 - Unrecoverable errors - 1 in 10^{11} bits read
 - Preventative maintenance - clean read/write head
- Weight
 - 31 lb (14.1 KB)

Dimensions

System Unit

- Height - 6 in. (15.2 cm)
- Width - 16.5 in. (42 cm)
- Depth - 16.5 in. (42 cm)

Weight

System Unit

- 5-1/4 inch, 1.2 MB diskette drive/5-1/4 inch,
40 MB hard disk 30.3 lb (13.8 kg)

Power

Universal power supply, 115/230V, switch selectable

Recommended Operating Environment

Temperature - 50-90 degrees Fahrenheit (10-32
degrees Celcius)

Relative humidity - 20% to 80%

Operating System

DOS

Supplied Software

MS-DOS Operating System
PC AP-M User Diagnostic diskette
Setup/Special Utilities diskette

Expansion Slot Connections

8-Bit Bus		
B-Side	Pin	A-Side
GND	1	I/O CH CHK/
RESET DRV	2	SD7
+5V	3	SD6
IRQ9	4	SD5
-5V	5	SD4
DRQ2	6	SD3
-12V	7	SD2
OWS	8	SD1
+12V	9	SD0
GND	10	I/O CH RDY/
SMEMW/	11	AEN
SMEMR/	12	SA19
IOW/	13	SA18
IOR/	14	SA17
DACK3/	15	SA16
DRQ3	16	SA15
DACK1/	17	SA14
DRQ1	18	SA13
REFRESH/	19	SA12
CLK	20	SA11
IRQ7	21	SA10
IRQ6	22	SA9
IRQ5	23	SA8
IRQ4	24	SA7
IRQ3	25	SA6
DACK2/	26	SA5
T/C	27	SA4
BALE	28	SA3
+5V	29	SA2
OSC	30	SA1
GND	31	SA0

16-Bit Bus (extension)		
D-Side	Pin	C-Side
MEM CS 16/	1	SBHE
I/O CS 16/	2	LA23
IRQ10	3	LA22
IRQ11	4	LA21
IRQ12	5	LA20
IRQ13	6	LA19
IRQ14	7	LA18
DACK0/	8	LA17
DRQ0	9	MEMR/
DACK5/	10	MEMW/
DRQ5	11	SD8
DACK6/	12	SD9
DRQ6	13	SD10
DACK7/	14	SD11
DRQ7	15	SD12
+5V	16	SD13
MASTER/	17	SD14
GND	18	SD15

I/O Address Map

Hex. Range	Use
000-01F	DMA controller 1, 2837A-5
020-03F	Interrupt controller 1, 8259A, Master
040-05F	Timer
060-06F	8042 Keyboard
070-07F	Real-time clock, NMI (nonmaskable interrupt) mask
080-09F	DMA page registers, 74LS612
0A0-0BF	Interrupt controller 3, 8259A
0F0	Clear Arithmetic Coprocessor Busy
0F1	Reset Arithmetic Coprocessor
0F8-0FF	Arithmetic Coprocessor
170-17F	Hard disk (secondondary)
1F0-1F7	Hard disk (primary)
200-20F	Game I/O
278-27F	Parallel printer port 2
2B0-2DF	Alternate enhanced Graphics Adapter
2F0-2F7	Reserved
2F8-2FF	Serial port 2 (secondondary)
300-31F	Prototype card
338-33F	Tape drive
360-36F	PC Network
370-377	Diskette controller (secondondary)
378-37F	Parallel printer port 1
380-38F	SDLC, synchronous 2/MFCA
3A0-3AF	Synchronous 1/MFCA
3B0-3BF	Monochrome Display and Printer Adapter
3C0-3CF	Enhanced Graphics Adapter
3D0-3DF	Color/Graphics Monitor Controller
3F0-3F7	Diskette controller (primary)
3F8-3FF	Serial port 1 (primary)
02E2-02E3	Data acquisition (Adapter 0)
06E2-06E3	Data acquisition (Adapter 1)
NOTE: I/O addresses hex. 000 to 0FF are reserved for the system board I/O. Hex. 100 to 3FF are available on the I/O channel.	

Appendix E

SPECIAL UTILITIES

This appendix describes the special utility programs that are contained on the PC AP-M Special Utilities diskette. These utilities are unique to the PC AP-M, and are not contained on the MS-DOS diskettes.

THE TURBO COMMAND

Currently, the only special utility for the AP-M is the TURBO command. The TURBO command allows you to change the processor speed of the AP-M between the high (10 MHz) and low (8 MHz) settings. The AP-M powers on with the processor speed at the low setting.

Use the TURBO command instead of the FREQ command, supplied on your MS-DOS diskette.

To make it easier to use the TURBO command, you should copy the TURBO command into your DOS command directory if you have a hard disk system, or onto your DOS system diskette if you have a diskette system.

Changing to High Speed

To change to the high processor speed:

Type:

TURBO +

at the DOS prompt, and press <Enter>.

Changing to Low Speed

To change to the low processor speed:

Type:

TURBO -

at the DOS prompt, and press <Enter>.

Automatically Powering on Your System at High Speed

If you want your system to power on at the high speed, enter the following command line into your AUTOEXEC.BAT file:

d:<directory path> TURBO +

where d:<directory path> is the drive and directory in which the TURBO command file is located.

GLOSSARY

applications programs

Programs designed for a specific purpose, such as solving a particular business or mathematical problem.

asynchronous communications

Method of data transmission, where characters are preceded by a start bit, and followed by a stop bit. This method permits the time between character transmission to vary.

bit

Binary digit. The smallest unit of computer data.

board

Printed circuit board. The board onto which computer components are soldered. Thin wires are printed to connect the components.

boot

To start up a computer program.

bps

Bits per second. A unit of transmission. Also called baud rate.

busy lamp

Indicator on the front of a diskette drive that lights when the drive is writing to or reading a diskette.

byte

Group of eight bits.

chip

Integrated circuit. A miniature circuit, made by etching electronic components on a silicon wafer.

clock

Electronic timer used to synchronize computer operations.

cold boot

Restarting the computer by turning it off, and then back on.

cursor

An image on the screen that indicates where the next typed data will appear.

diskette

A thin flexible platter, coated with a magnetic material for storing information.

diskette drive

A magnetic device that writes on and retrieves data from a diskette.

double-density

Refers to how information is "packed" onto a diskette. Information on a double-density diskette is packed at twice the density of that on a single-density diskette.

expansion slot

Location inside the system unit for the installation of an optional printed circuit board. There are six expansion slots for option boards in the PC AP-M.

expansion option

Add-on hardware, such as a disk drive or memory expansion board, that expands the PC AP-M's power and versatility.

formatting

Preparing a diskette to accept data.

hard disk

A rigid magnetic storage device that provides fast access to stored data.

hardware

The electronics and mechanical parts that a computer is made of.

high capacity

Refers to the storage capacity of a diskette or diskette drive that uses high capacity diskettes. In the PC AP-M, a high capacity diskette drive uses a high capacity diskette with a storage capacity of 1.2 MB.

Hz

Hertz. A unit of frequency equal to one cycle per second.

interface

A connection that enables two devices to communicate.

KB

Kilobyte; 1024 bytes.

load

To enter a program into the computer's memory from a diskette drive or hard disk drive.

load lever

Lever on the front of a diskette drive that locks the diskette in place.

memory

The electronic "space" where information is stored in a computer.

menu

A video display of programs or tasks.

modem

MOdulator-DEModulator. A device that links computers over a telephone line.

monochrome

A monitor that features different shades of a single color.

overwrite

Storing information at a location where information is already stored, thus destroying the original information.

parallel interface

Interface that communicates eight bits at a time.

parallel printer

A printer with a parallel interface.

peripheral

Input or output device not under direct control of the computer, such as a printer.

pixels

Picture elements. Tiny dots that make up a screen image.

port

Place on a computer where a peripheral can be plugged in.

processor

A computer on a chip.

RAM

Random access memory. Temporary read/write memory that stores information only when the computer is on.

read

To extract data from a storage device, such as a diskette, or memory.

ROM

Read-only memory. Permanent computer memory that cannot be written to.

RS-232C

Standard interface for serial devices.

serial interface

An interface that communicates information one bit at a time.

serial printer

A printer with a serial interface.

software

Computer programs.

synchronous communication

Method of data transmission where transmission is regulated by a clock.

system board

The main printed circuit board inside the system unit, into which other boards are connected.

system unit

The PC AP-M component that contains the computer parts, disk drives, and option boards.

VRAM

Video random access memory.

write

To record or store information in a storage device.



BULL

Technical Publications Remarks Form

TITLE

AP-M
OWNER'S MANUAL
ADDENDUM A

ORDER NO.

HS28-00A

DATED

JANUARY 1989

ERRORS IN PUBLICATION**SUGGESTIONS FOR IMPROVEMENT TO PUBLICATION**

Your comments will be investigated by appropriate technical personnel and action will be taken as required. Receipt of all forms will be acknowledged; however, if you require a detailed reply, check here.

☐

PLEASE FILL IN COMPLETE ADDRESS BELOW.

FROM: NAME _____ DATE _____

TITLE _____

COMPANY _____

ADDRESS _____

---CUT ALONG LINE---

PLEASE FOLD AND TAPE-

NOTE: U.S. Postal Service will not deliver stapled forms



NO POSTAGE
NECESSARY
IF MAILED
IN THE
UNITED STATES

BUSINESS REPLY MAIL

FIRST CLASS PERMIT NO. 39531, WALTHAM, MA

POSTAGE WILL BE PAID BY ADDRESSEE

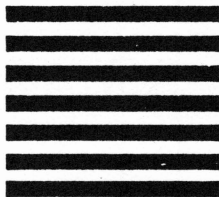
Bull HN Information Systems Inc.

ATTN: PUBLICATIONS, MA39/486

200 Smith Street

P. O. Box 9199

Waltham, Massachusetts, 02254-9832



-CUT ALONG LINE-



Bull HN Information Systems Inc.

Corporate Headquarters: 300 Concord Rd., Billerica, MA 01821

U.S.A.: 200 Smith Street, MS 486, Waltham, Massachusetts 02154

Mexico: Hamburgo No. 64, Col. Juarez Deleg. Cuauhtemoc, 06600 Mexico, D.F.

Asia: 4/F, Shui on Centre, 6-8 Harbour Road, Wanchai, Hong Kong

U.K.: Great West Road, Brentford, Middlesex TW8 9DH, England

Canada: 155 Gordon Baker Rd., North York, Ontario M2H 3P9

Australia: 124 Walker St., North Sydney, N.S.W. 2060

New Zealand: 14/16 Liverpool St., Auckland 1

Italy: 32 Via Pirelli, 20124 Milan

Printed in U.S.A.

HS28-00